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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/768,039

02/02/2004

Miho Watanabe

118506

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25944

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09/12/2007

OLIFF & BERRIDGE, PLC

P.O. BOX 19928

ALEXANDRIA, VA 22320

EXAMINER

OLSEN, ALLAN W

ART UNIT

PAPER NUMBER

1763

MAIL DATE

DELIVERY MODE

09/12/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|   |                 |                 |  |
|---|-----------------|-----------------|--|
| <b>Advisory Action</b><br><b>Before the Filing of an Appeal Brief</b> | Application No. | Applicant(s)    |  |
|   | 10/768,039      | WATANABE ET AL. |  |
|   | Examiner        | Art Unit        |  |
|   | Allan Olsen     | 1763            |  |

**--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

THE REPLY FILED 04 September 2007 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

- a) ☒ The period for reply expires 4 months from the mailing date of the final rejection.  
b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on \_\_\_\_\_. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

#### AMENDMENTS

3. ☐ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because  
(a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);  
(b) ☐ They raise the issue of new matter (see NOTE below);  
(c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or  
(d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: \_\_\_\_\_. (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).  
5. ☐ Applicant's reply has overcome the following rejection(s): \_\_\_\_\_.  
6. ☐ Newly proposed or amended claim(s) \_\_\_\_\_ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).  
7. ☐ For purposes of appeal, the proposed amendment(s): a) ☐ will not be entered, or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.  
The status of the claim(s) is (or will be) as follows:  
Claim(s) allowed: \_\_\_\_\_.  
Claim(s) objected to: \_\_\_\_\_.  
Claim(s) rejected: \_\_\_\_\_.  
Claim(s) withdrawn from consideration: \_\_\_\_\_.

#### AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).  
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).  
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

#### REQUEST FOR RECONSIDERATION/OTHER

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because:  
See continuation pages.  
12. ☐ Note the attached Information Disclosure Statement(s). (PTO/SB/08) Paper No(s). \_\_\_\_\_.  
13. ☐ Other: \_\_\_\_\_.

*Allan Olsen*

Allan Olsen  
Primary Examiner  
Art Unit: 1763

### ***Response to Arguments***

Applicant's arguments filed September 4, 2007 have been fully considered but they are not persuasive.

#### **Rejections Under 35 U.S.C. §103(a)**

##### **A. Niu in view of Ito and Horiuchi in view of Ito**

Regarding Ito, applicant argues (with emphasis added):

*"Ito does not teach or suggest the patterning step using a resin resist recited in claims 16 and 41. Ito teaches forming an aluminum film that is to serve as a mask on the carbon nanotube film, and then a resist is coated onto the aluminum film for patterning. See paragraph [0107] of Ito. The resist of Ito is utilized to pattern the aluminum film, not the carbon nanotube structure layer as in claims 16 and 41. The resist is then stripped away, and the carbon nanotube film is etched using the aluminum film as the mask. See paragraphs [0110]-[0111] of Ito. However, if the resist layer is not stripped away, the resist will be removed during the dry etching process. See paragraph [0127] of Ito.*

The examiner contends that when the resist is not stripped away, at least the beginning part of the carbon nano-tube patterning step takes place with a bilayer mask that comprises resin resist. As such the Ito does teach the forming a resin resist layer on a region of the carbon nanotube structure layer and removing the exposed portions of the carbon nanotube structure layer that are not covered with the resist layer by dry etching.

##### **B. Niu in view of Ito and French and Horiuchi in view of Ito and French**

Regarding French, applicant argues:

French does not teach or suggest a method of manufacturing a carbon nanotube structure, comprising (1) patterning a crosslinked carbon nanotube structure layer by

forming a patterned resin resist layer on the crosslinked carbon nanotube structure layer and dry etching to remove exposed portions of the carbon nanotube structure layer that are not covered with the resist layer by.

French does not teach or suggest a structure in which carbon nanotubes are chemically bonded with each other, as recited in the present claims.

The examiner notes, as did applicant, that French discloses that the term "nano-structure" means tubes, rods, cylinders, bundles, wafers, disks, sheets, plates, planes, cones, slivers, granules, ellipsoids, wedges, polymeric fibers, natural fibers, and other such objects which have at least one characteristic dimension less than about 100 microns.

The examiner further notes that French teaches the method of the invention applies to chemical modified nanotubes. See, for example:

[0154] In a preferred embodiment it may be desirable to disperse nanotubes prior to their coating on the substrate. Typically, nanotubes take the form of "rope" which aggregations of highly polarized, nanotubes which readily form parallel bundles or ropes with a large van der Waals binding energy. Some separation of the ropes occurs when nanotubes carbon-based nanotubes of the invention can be either multi-walled nanotubes (MWNTs) or single-walled nanotubes (SWNTs). A MWNT, for example, includes several concentric nanotubes each having a different diameter. Thus, the smallest diameter tube is encapsulated by a larger diameter tube, which in turn, is encapsulated by another larger diameter nanotube. A SWNT, on the other hand, includes only one nanotube.

[0144] It will be appreciated by the skilled artisan that the cutting methods of the invention will apply to chemically modified nano-structures as well as those that are unmodified. Soluble full-length single wall nanotubes can be formed by reacting the tubes with octadecylammonium, SWNT—carboxylate zwitterions by the reaction of acid modified SWNT—with octadecylammonium amines (see for example *J. Phys. Chem. B. Vol. 105, No. 13, 2001, page 2526*). Rational modification will provide nano-structures of greater solubility in a particular dispersant, resulting in higher concentrations of structures for cutting.

Therefore, one skilled in the art would expect French's use of a patterned resin resist to plasma etch nanostructures to be successfully applied to crosslinked carbon nanotubes.

In response to applicant's argument that the references fail to show a certain feature of applicant's invention, it is noted that the feature upon which applicant relies (i.e., "the carbon nanotube structure of the present claims has a structure such that inter- crosslinking is performed, and a resin is caused to permeate into the inside of holes of the network structure") is not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).